

What is claimed is:

1                   1.       A light emitting device comprising:  
2                    (a)     a primary light source which emits primary light; and  
3                    (b)     a phosphor material which absorbs at least a portion of the primary  
4     light and emits a secondary light, wherein the secondary light or the combination of the  
5     secondary light with the primary light comprises a white light with a color rendering index  
6     of at least 90.

1                   2.       The light emitting device of claim 1, wherein white light has a color  
2     rendering index of at least 95.

1                   3.       The light emitting device of claim 1, wherein the white light has a  
2     color rendering index of 100.

1                   4.       The light emitting device of claim 1, wherein the device produces  
2     white light with an efficiency of at least 30 lm/w.

1                   5.       The light emitting device of claim 1, wherein the primary light is  
2     ultraviolet or blue light.

1                   6.       The light emitting device of claim 1, wherein the primary light  
2     comprises wavelengths of from 320 nm to 480 nm and the secondary light has a lower  
3     energy than the primary light.

1                   7.       The light emitting device of claim 6, wherein the primary light  
2     source is a light emitting diode.

1                   8.       The light emitting device of claim 1, wherein the primary light  
2     source is an infrared light source and the secondary light has a higher energy than the  
3     infrared light.

1                   9.       The light emitting device of claim 8, wherein the primary light  
2     source is a red light emitting diode.

1                   10.      The light emitting device of claim 1, wherein the phosphor material  
2     comprises a plurality of nanoparticles.

1                   11.    The light emitting device of claim 10, wherein the nanoparticles  
2  comprise a Group IV semiconductor.

1                   12.    The light emitting device of claim 10, wherein the nanoparticles  
2  have an average particle diameter of from about 1 to about 150 angstroms.

1                   13.    The light emitting device of claim 1, wherein the phosphor material  
2  has an emission profile comprising red, green and blue emission peaks.

1                   14.    The light emitting device of claim 11, wherein the Group IV  
2  semiconductor is silicon.

1                   15.    The light emitting device of claim 11, wherein the Group IV  
2  semiconductor is germanium.

1                   16.    A light emitting device comprising:

2                   (a)    a primary light source which emits primary light; and  
3                   (b)    a phosphor material comprising a plurality of nanoparticles which  
4  absorb at least a portion of the primary light and emit a secondary light, wherein the  
5  secondary light or the combination of the secondary light with the primary light comprises  
6  a white light and further wherein the white light is produced with an efficiency of at least  
7  30 lm/w.

1                   17.    The light emitting device of claim 16, wherein the nanoparticles  
2  comprise a Group IV semiconductor.

1                   18.    The light emitting device of claim 17, wherein the nanoparticles  
2  have an average particle diameter of from about 1 to about 150 angstroms.

1                   19.    The light emitting device of claim 16, wherein the phosphor material  
2  has an emission profile comprising red, green and blue emission peaks.

1                   20.    The light emitting device of claim 17, wherein the Group IV  
2  semiconductor is silicon.

1                   21.    The light emitting device of claim 17, wherein the Group IV  
2  semiconductor is germanium.

1                   22. A light emitting device comprising:  
2                   (a) a primary light source which emits primary light; and  
3                   (b) a phosphor material comprising a plurality of nanoparticles, the  
4 nanoparticles comprising a Group IV semiconductor, which absorbs at least a portion of  
5 the primary light and emits a secondary light, wherein the secondary light or the  
6 combination of the secondary light with the primary light comprises a white light.

1                   23. The light emitting device of claim 22, wherein the primary light is  
2 ultraviolet or blue light.

1                   24. The light emitting device of claim 22, wherein the primary light  
2 comprises wavelengths of from 320 nm to 480 nm and the secondary light has a lower  
3 energy than the primary light.

1                   25. The light emitting device of claim 24, wherein the primary light  
2 source is a blue light emitting diode or an ultraviolet light emitting diode.

1                   26. The light emitting device of claim 23, wherein the primary light  
2 source is a fluorescent lamp.

1                   27. The light emitting device of claim 22, wherein the primary light  
2 source is an infrared light source and the secondary light has a higher energy than the  
3 infrared light.

1                   28. The light emitting device of claim 27, wherein the primary light  
2 source is a red light emitting diode.

1                   29. The light emitting device of claim 27, wherein the primary light is a  
2 halogen lamp or an incandescent lamp.

1                   30. The light emitting device of claim 22, wherein the nanoparticles  
2 have an average particle diameter of from about 1 to about 150 angstroms.

1                   31. The light emitting device of claim 22, wherein the phosphor material  
2 has an emission profile comprising emission peaks in the green to red regions of the visible  
3 spectrum.

1                   32.     The light emitting device of claim 22, wherein the phosphor material  
2 has an emission profile comprising emission peaks in the blue to red regions of the visible  
3 spectrum.

1                   33.     The light emitting device of claim 22, wherein the Group IV  
2 semiconductor is silicon.

1                   34.     The light emitting device of claim 22, wherein the Group IV  
2 semiconductor is germanium.

1                   35.     The light emitting device of claim 22, wherein the nanoparticles  
2 comprises core/shell nanoparticles comprising a Group IV semiconductor core and an  
3 inorganic shell.

1                   36.     The light emitting device of claim 35, wherein the inorganic shell  
2 comprises ZnS or CdS.

1                   37.     The light emitting device of claim 35, wherein the core comprises  
2 silicon and the shell comprises  $\text{Si}_3\text{N}_4$  or SiC.

1                   38.     The light emitting device of claim 35, wherein the core comprises  
2 silicon and the shell comprises Ge.

1                   39.     The light emitting device of claim 35, wherein the core comprises  
2 germanium and the shell comprises Si.

1                   40.     The light emitting device of claim 22, wherein the nanoparticles are  
2 dispersed in a binder.

1                   41.     The light emitting device of claim 22, wherein the primary light  
2 source comprises an electroluminescent device.

1                   42.     The light emitting device of claim 22, wherein the primary light  
2 source comprises an organic light emitting material.

1                   43.     The light emitting device of claim 42, wherein the nanoparticles are  
2 dispersed in the organic light emitting material.

1                   44.     A phosphor material comprising a plurality of luminescent group IV  
2     semiconductor nanoparticles having a polydisperse size distribution dispersed in a binder.

1                   45.     The phosphor material of claim 44, further comprising a plurality of  
2     electroluminescent particles dispersed in the binder.

1                   46.     The phosphor material of claim 44, wherein the binder is an  
2     electroluminescent polymer.

1                   47.     A phosphor material comprising a plurality of domains disposed on  
2     an organic film, each domain comprising a plurality of luminescent semiconductor  
3     nanoparticles having a substantially monodisperse size distribution.

1                   48.     The phosphor material of claim 47, wherein the organic film has a  
2     plurality of luminescent nanoparticles dispersed therein.

1                   49.     The phosphor material of claim 47, wherein the luminescent  
2     nanoparticles dispersed in the organic film have a substantially monodisperse size  
3     distribution.